REMARKS

In the current Office Action, the Examiner reopened prosecution, rejected claims

1 and 3/1, and objected to claims 2 and 3/2 for relying on a rejected parent claim.

Applicant thanks the Examiner for indicating that claims 2 and 3/2 would be allowable if

rewritten in independent form.

Rejections under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 1 and 3/1 under 35 U.S.C. §

103(a) as being unpatentable over the Mann reference (U.S. Patent No. 5,828,793) in

view of the Krymski reference (U.S. Patent No. 7,209,166). Specifically, the Examiner

remarked:

> Mann discloses a method of creating an image with
> a still video camera (col. 11 lines 43-46, figure 8, element
> 202). Mann further teaches that the image is transferred to
> a computer to be stored on a main memory 210 represented
> as 212_1, 212_2, 213_3 etc. (col. 11 lines 46-54). Mann also
> teaches that the composite images [are] formed from a
> series of input images wherein every pixel of the composite
> image is drawn from the corresponding pixel in each of the
> input source images according to a weighted average. The
> weighting is based on a certainty function associated with
> each source image pixel corresponding to an output pixel in
> the final composite image. The value of the relevant pixel
> parameter for a given final-image pixel (weighted average
> of n samples) is given by

$$\sum_n c_n P_n / \sum_n c_n$$

> where c_n is the certainty function associated with
> the corresponding pixel of each source image n (col. 6 line

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51-col 7 line 8). It is noted that P_n (pixel parameter) is dependent upon exposure time, brightness or luminance and the gain of the system. Mann teaches that the resulting pixel image represented by the expression above is saved in a target buffer 250 whose contents are shown on screen display 234 (col. 12 lines 32-49). The features such as gamma correction (other image data) are also stored in the target image data (col. 13 lines 4-8).

Mann fails to teach explicitly obtaining a substantially linear representation of the image by combining two images. However[,] Krymski teaches to write the image signal into the memory twice, first after [a] short integration and then after [a] long integration. Thus, after two operations of sampling, the result[ing] voltage in the memory will be a linear superposition of the two signals representing [the] bright and [the] dark image (Col. 3 lines 2-9, figures 1 and 3). Fig. 4 clearly teaches that [the] combined signal is a substantially linear representation of the brightness (light intensity) of the image [acquired] by combining two images. It is noted that in order to obtain a wide dynamic range image the two long and short exposure images are combined so that the final image produces increased highlight detail despite the limited response of the system that produced the component images[.]

Therefore[,] taking the combined teachings of Mann and Krymski, it would be obvious to one skilled in the art at the time of the invention to have been motivated to have obtained a substantially linear representation of the image by summing two images in order to obtain a wide dynamic range image so that the final image provides increased highlight detail despite the limited response of the system that produced the component images.

[Claim 3/1]

Mann teaches that the different images are color so that the offset will be color dependent (col. 13 lines 21-30).

Office Action, pages 3 and 4.

Applicant respectfully traverses this rejection. The burden of establishing a *prima*

facie case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214

U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining

the teachings of the prior art to produce the claimed invention absent some teaching or

suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore*

Hospital, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Even if, *ad*

arguendo, the references *could* be combined or modified in the proposed manner, it does

not render the resultant combination obvious unless the prior art also suggests the

desirability of the combination. *See In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d. 1430 (Fed.

Cir. 1990). Accordingly, to establish a *prima facie* case, the Examiner must not only

show that the combination includes *all* of the claimed elements, but also a convincing

line of reason as to why one of ordinary skill in the art would have found the claimed

invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*,

227 U.S.P.Q. 972 (B.P.A.I. 1985).

Features Missing from the Cited References

Independent claim 1 recites, *inter alia*:

> obtaining a **substantially linear** representation of
> the brightness of an image, the method comprising, for
> each of a set of pixels (x, y) in a two dimensional array,
> calculating an estimate of the true image intensity (i_{xy}) as a
> weighted average of n samples of the apparent image
> intensity ($v_{n,xy}$) as

$$\hat{i}_{xy} = \frac{\sum\limits_{n} \left(w_{n,xy} \left(\frac{v_{n,xy} - C}{KT_n} \right) \right)}{\sum\limits_{n} w_{n,xy}} = \frac{1}{K} \frac{\sum\limits_{n} \left(w_{n,xy} \left(\frac{v_{n,xy} - C}{T_n} \right) \right)}{\sum\limits_{n} w_{n,xy}}$$

where $v_{n,xy}$ is the apparent intensity measured, n is greater than or equal to 2, T_n is the exposure time, K is the gain of the system, C is an offset and $w_{n,xy}$ is a weighting factor which is defined to maximise the signal to noise ratio and discard insignificant, that is saturated or near zero, values;

thereafter saving each of the values i_{xy} together with other data representing the image; and

outputting the image to a display or to a printing device. (Emphasis added.)

The new obviousness rejection that has been raised by the Examiner is not correct (again). The present invention has no relevance to Krymski and nor does Krymski have any relevance to the present invention.

As has been made clear to the Examiner during the prosecution of this application, the technique of additively superposing two or more exposures to extend the dynamic range of a camera is well known in the art. However, a problem with this technique is that the response to brightness is non-linear—that is if you plot the output against the light intensity you would not get a single, straight line. This characteristic of linearity of response is vital to the present invention and it is the vital distinguishing characteristic of the invention.

The Examiner has cited Figure 4 in Krymski. However, this is exactly the type of diagram that proves that Krymski's system does not provide a linear response. It consists of two straight line segments whereas the present invention would produce a single straight line. The graph in Figure 4 of Krymski does not represent a linear relationship.

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(Applicant believes that the correct term to describe this graph in Krymski is piecewise-linear).

Without a linear response, it is not possible to say "point X is twice as bright as point Y because the value in image corresponding to point X is twice that corresponding to point Y." This is the essential requirement to make scientific measurements from the image and this is not achieved by Krymski.

Therefore, Krymski does not teach anything about achieving linearity (and as a result of teaching piecewise-linear actually teaches away from the present invention), and this point is also missing from Mann. Consequently, a combination of Mann and Krymski does not result in the present invention and the present invention is non-obvious. For these reasons among others, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 103 and allowance of all pending claims.

Conclusion

The Applicant respectfully submits that all pending claims are in condition for allowance. However, if the Examiner wishes to resolve any other issues by way of a telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number indicated below.

In accordance with 37 C.F.R. § 1.136, Applicant hereby provides a general authorization to treat this and any future reply requiring an extension of time as incorporating a request thereof.

Respectfully submitted,

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